

serious defect in the work, and may be passed over with this allusion.

Very interesting are two introductory chapters on the climatology and lithology of West Yorkshire, specially in relation to plant-life, which many persons would doubtless gladly possess, apart from the enumeration of the plants of the region. In the list of pelophilous (clay-loving) plants, we note *Spiræa Filipendula*, a plant so strictly associated with chalk in the south of England, that we are surprised to find it among those characteristic of clay and mud-soils. Perhaps it was a slip of the pen for *S. Ulmaria*?

The total number of species of vascular plants enumerated is 1042, whereof 995 are phanerogams, which is equal to the whole phanerogamic flora of New Zealand, even after allowing 40 off for "critical species" of various genera. On the other hand, the vascular cryptogams of West Yorkshire are only 47 against 138 in New Zealand, of which 120 are ferns. Fortunately for the New Zealanders, and Australians too, for that matter, they are free from the "horse-tails," which are such terrible pests to farmers in some districts of this country; but seven species are indigenous in West Yorkshire.

Cellular cryptogams are also included in Lees's "Flora," and occupy about 250 pages. The enumerations of some of the groups are exceedingly imperfect—imperfect in consequence of their not having been investigated—and it would have been much more convenient for the majority of workers had this class been reserved for a separate volume. W. B. H.

OUR BOOK SHELF.

A Manual of Practical Assaying. By John Mitchell, F.C.S. Edited by William Crookes, F.R.S. Sixth Edition. (London: Longmans, Green, and Co., 1888.)

MITCHELL'S "Assaying" is so well known to all whom the subject concerns, that it is hardly necessary at present to do more than announce the appearance of a new edition. In this edition, as Mr. Crookes explains, much new matter has been introduced, and matter which had become obsolete has been omitted. Among the more important of the additions are descriptions of the "automatic sampling-machine," invented by Mr. D. W. Brunton; many new gas-furnaces and burners for the laboratory, devised by Mr. Fletcher, Messrs. J. J. Griffin, and others; new blow-pipe reagents and operations; new processes, dosimetric, volumetric, and calorimetric, for the partial and complete assay of iron ores, iron, steel, spiegeleisen, &c. In the copper assay the American system of fire assay is here, for the first time in this country, fully described. In the assay of silver, the action of bismuth on the ductility of this metal has received adequate attention. Much has been added about gold ores; and improved modes of assaying the precious metal and detecting it in poor ores are given. The number of woodcuts has been increased from 188 in the last edition to 201 in the present edition.

Asbestos, its Production and Use. By Robert H. Jones. (London: Crosby Lockwood and Son, 1888.)

THIS little book, written in epistolary style, though possessing little or no scientific value, contains an interesting account of the "asbestos" mines of Canada, and of the methods pursued in working the mineral in that country. It is precisely ten years since the first Canadian chrysotile mines were opened, and the annual yield at the present time appears to be more than 2000 tons, so that the

new locality is rapidly becoming an important rival to the older and better-known asbestos mines of the Italian Alps. The author gives a brief description of the mode of occurrence of the mineral in the Serpentine belt which traverses the provinces of Megantic and Beauce in Quebec, and prophesies a wider development of this industry in the future; he does not, however, supply any such details as would suggest either the origin or the probable extent of the Canadian "asbestos," and the book contains no original observations of any scientific importance. The author does not appear to be aware of the difference between asbestos and chrysotile. The pages most interesting to general readers are those which contain an account of the latest uses to which the mineral is now applied; among which may be mentioned fire-balloons, theatre-curtains, fire-proof paint, filters, and letter-paper.

Industrial Instruction. By Robert Seidel. Translated by Margaret K. Smith. (Boston: D. C. Heath and Co., 1888.)

IN the years 1882 and 1884 industrial instruction formed the subject of much discussion in the Synod of the Canton of Zürich. Herr Seidel, who had long devoted earnest attention to the question, carefully answered all the objections to industrial education which were raised in the course of these debates; and the substance of his replies is embodied in the work translated in the present volume. If there is still anyone who has doubts as to the value of manual training in schools, he would profit largely by reading this little book. Herr Seidel's main point is that such training is absolutely essential in the interests of true education, and in working out this view he displays great intellectual resource and a thorough appreciation of the laws of mental growth. He is not afraid that when the need for this "new departure" is generally recognized the task imposed upon teachers will be beyond their capacities. "The training of teachers for industrial instruction," he says, "offers no difficulty, and will not (as has been asserted) by any means involve the necessity for two kinds of teachers. The teacher can very well master the new task, and if his prejudice has disappeared, will very gladly undertake it. Probably the imparting of industrial instruction will become a favourite employment of the teacher, because the change refreshes and the labour gladdens him."

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Electric Fishes in the River Uruguay.

IN Sir Horace Rumbold's "Great Silver River" (London, 1887), the author, when on the Upper Uruguay above Uruguayana, speaks of a "kind of Electric Eel (*Gymnotus*) called here *Rayo* or Lightning, of the effects of contact with which, very curious and unrelatable stories are told."

The range of the *Gymnoti* is usually supposed to be confined to the waters of the Orinoco and Amazons and their affluents, so that it would be very desirable to ascertain what this supposed electric fish of the Rio Uruguay really is. Perhaps some of your readers in the Argentine Republic may be able to assist us in solving this problem, which would be best done by the transmission of specimens of the fish in question to the British Museum. P. L. SCLATER.

3 Hanover Square, London, W., June 8.

The Salt Industry in the United States.

MR. WARD in his letter to NATURE (May 10, p. 29), respecting the salt industry in the United States, makes no mention of the important and numerous contributions to the

literature of that subject by Dr. Charles A. Goessmann, at the present time Director of the Massachusetts Agricultural Experiment Station, but formerly, from 1861 to 1869, chemist to the Onondaga Salt Company, at Syracuse, N. Y. While filling that position he investigated very thoroughly the salt deposits of New York, Michigan, Goderich, Canada, and Petit Anse Island, Louisiana, and his published reports and memoirs (some twenty in number) upon the salines, brines, and mineral springs of the country form, for the period which they cover, a very complete and valuable record of the salt industry in the United States. Amherst, Mass., May 26. F. TUCKERMAN.

Prof. Greenhill on "Kinematics and Dynamics."

MAY I ask space for a few short comments on Prof. Greenhill's letter in your issue of May 17 (p. 54), so far as it is directed against myself.

(1) The "circumlocutions" referred to are not of my devising, but are current phrases which involve no ambiguity and are useful for avoiding frequent repetition.

(2) It is not true that "although such words as 'a force equal to the weight of the mass of 10 pound weights' do not occur in Prof. MacGregor's book, they are strictly derived from his definitions." According to my definitions, it is the body itself which has weight, not its mass; and the above phrase is therefore meaningless.

(3) Prof. Greenhill has not cited a single instance to justify his charge that I am at variance with my own definition of the weight of a body in the majority of the subsequent examples.

(4) He now seems to admit that in my hydrostatical equations pressure may be expressed in pounds on the square foot, but to claim that it can be done only in a clumsy manner. There is doubtless a certain clumsiness, but it seems to me to be due to the employment of a clumsy set of units.

(5) Your reviewer still demands that I should give the dimensions of the earth, not in terms of the actual metre, but in terms of what the original designers of the metre intended it to be; but he gives no reason for this strange demand.

(6) If the knot is a unit of velocity, the term *knots per hour* is of course redundant. I have always considered it an abbreviation, but have no means at hand of settling the point.

(7) Prof. Greenhill tacitly admits that he was in error in accusing me of misusing the term *elongation*.

(8) He makes no attempt to substantiate his statement that my equations of energy were not expressed in proper form.

(9) He does not answer my question as to which of the most recent treatises on dynamics my treatment of units shows me to have read without profit and discrimination.

Edinburgh, May 31.

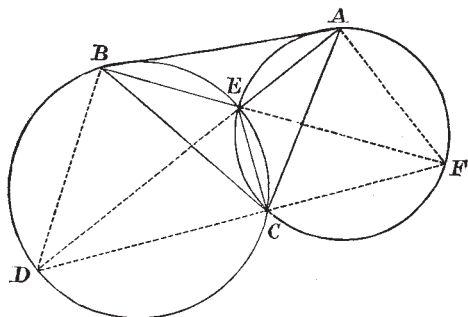
J. G. MACGREGOR.

Further Use of Ptolemy's Theorem (Euclid, VI. D.) for a Problem in Maxima and Minima.

To find E within $\triangle ABC$ such that

$$AE \sin BEC + BE \sin CEA + CE \sin AEB$$

shall be a maximum.



Keep BEC constant; produce AE to cut circum-circle of BEC (which is then a fixed circle) in D .

Then $\sin BEA = \sin BED = \sin BCD$,
 $\sin AEC = \sin CED = \sin CBD$,
 and $\sin BEC = \sin BDC$;

$$\therefore \frac{BC}{\sin BEC} = \frac{CD}{\sin AEC} = \frac{DB}{\sin AEB};$$

$$\therefore AE \sin BEC + BE \sin CEA + CE \sin AEB$$

is proportional to

$$AE \cdot BC + BE \cdot CD + CE \cdot BD,$$

and therefore to

$$AE \cdot BC + ED \cdot BC. \quad (\text{Eu. VI. D.}),$$

which

$$= AD \cdot BC.$$

For a maximum AE passes through centre of circum-circle of BEC .

Similarly BE passes through centre of circum-circle of CEA . Let it cut it again in F .

$$\begin{aligned} \angle BCE &= \angle BDE, \\ &= \angle BFA \text{ in same segment of circle through } F, A, B, D, \\ &= \angle ACE. \end{aligned}$$

Similarly

$$AE, BE \text{ bisect } \angle CAB, \angle ABC.$$

$$\therefore E \text{ is the in-centre of } \triangle ABC.$$

Bedford.

E. M. LANGLEY.

Davis's "Biology."

IF I may argue from the contents of Mr. Davis's book, he should be a good judge of what constitutes "falling into a common mistake," and yet I cannot accept his opinion as to my having accomplished this feat. I have refrained from enumerating the common mistakes which his little book contains, but I am not prepared to allow him to lay down the law as to educational methods. In my opinion it is a grievous error to present any subject of study to University students under two aspects, that of "pass" and that of "honours." Whatever is worth doing at all (in academic exercises) is worth doing well, and no regulations sanctioned by any University Senate—however philanthropic, incompetent, and imperial—can make the perennial iteration of the statements in a cram-book concerning six plants and six animals a satisfactory substitute for the study of zoological and botanical science, or anything but a pernicious torturing of the youthful mind.

THE REVIEWER.

M. FAYE'S THEORY OF STORMS.¹

ACCORDING to M. Faye, "There exist in meteorology two theories diametrically opposed—one which considers air-whirls round a vertical axis, including cyclones, typhoons, tornadoes, and waterspouts, to originate in the upper currents of the atmosphere; and the other which considers each of these as the effect of a local rarefaction, giving rise at the surface of the ground, in an atmosphere in a more or less unstable condition, to an ascending current of air, which borrows a gyratory tendency from the rotation of the ground itself." Such is the opening sentence of the pamphlet before us, which embodies a *résumé* of M. Faye's discussions in the French Academy with those who do not accept his peculiar views on the generation of atmospheric disturbances.

M. Faye upholds the former theory with that incisive vigour which characterizes our Gallic neighbours, and attacks the meteorologists with whose writings he is acquainted, beginning with poor Franklin and ending with Sprung in 1885, without mercy, but at the same time without the smallest reference to physics apart from mechanics.

Before pointing out some of the grave errors of fact, as well as theory, into which we deem M. Faye to have fallen, it may be as well to see if we cannot attempt a reconciliation between these two opposite views, which are considered to be prevalent.

To avoid mixing up tornadoes and cyclones, which we hold to be, if not generically, at all events specifically, distinct, let us first consider the former alone. The point

¹ "Sur les Tempêtes." Par M. H. Faye. (Paris: Gauthier-Villars, 1887.)